A SYNOPSIS OF THE GENUS *PACKERA* (ASTERACEAE: SENECIONEAE) IN MEXICO

CRAIG C. FREEMAN

McGregor Herbarium
University of Kansas
2045 Constant Avenue
Lawrence, KS 66047-3279, U.S.A.

THEODORE M. BARKLEY

Herbarium, Division of Biology
Kansas State University
Manhattan, KS 66506-4901, U.S.A.

ABSTRACT

The species of *Packera* (Asteraceae: Senecioneae) have been treated in the past as the "Aureoid" group within the genus *Senecio*. Fifteen species and three varieties of *Packera* are recognized in Mexico; a key, an account of the nomenclature, and statements of ranges and habitats are presented. Three new combinations are proposed: *Packera scalaris* var. *parrasiana* (Greenm.) C.C. Freeman & T.M. Barkley, comb. nov.; *Packera scalaris* var. *carmenensis* (C.C. Freeman) C.C. Freeman & T.M. Barkley, comb. nov.; and *Packera zimapanica* (Hemsley) C.C. Freeman & T.M. Barkley, comb. nov.

RESUMEN

Las especies de *Packera* (Asteraceae: Senecioneae) han sido tratadas en el pasado como grupo "Aureoide" dentro del género *Senecio*. En México se reconocen quince especies y tres variedades de *Packera*. Se presentan una clave, un informe nomenclatural y otro relativo a las árcas y los hábitats. Se proponen tres combinaciones nuevas: *Packera scalaris* var. *parrasina* (Greenm.) C.C. Freeman & T.M. Barkely, comb. nov., *Packera scalaris* var. *carmenensis* (C.C. Freeman) C.C. Freeman & T.M. Barkely, comb. nov., and *Packera zimapanica* (Hemsley) C.C. Freeman & T.M. Barkeley, comb. nov.

Two items prompt this paper: one is the now widely accepted realignment of the generic concepts in the Asteraceae, and the other is the revival of interest in floristics. This paper provides a catalog for the Mexican species of the segregate genus *Packera* and an account of their nomenclature, plus a key for their determination.

The species referable to *Packera* Á. Löve & D. Löve have been treated traditionally as an informal assemblage called the "Aureoid" group within the super-genus *Senecio*; the biology of this group was discussed in detail by Barkley (1988). *Packera* was erected in 1976, and its circumscription has grown to accomodate the whole Aureoid complex. The species of *Packera*

SIDA 16(4): 699–709. 1995

are distinguished from other members of *Senecio*, s.l., by sharing all or most of the following characters: perennial herbs arising from creeping rootstocks or a caudex; basal leaves well developed, cauline leaves progressively reduced upward; leaf margins without callose denticles; roots fibrous, thin, and branching; haploid chromosome numbers 22 or 23, or numbers derived therefrom. A justification for the segregation of *Packera* is presented by Barkley, Clark, and Funston (in press).

Packera includes some 60 species, ranging from Mexico to the Arctic and into eastern Siberia, but most of them are in temperate North America. Many occur in sites of continued mild disturbance, but few are truly weedy. The species are often imprecisely defined, and this imprecision is reflected in a complicated taxonomic history (Barkley 1988). The generic name commemorates Dr. John Packer of the University of Alberta, Canada, an intrepid student of the northern flora.

The comparative cytology of the members of *Packera* is complicated by polyploidy and some apparent miscounts that have entered the literature. The comparative cytology is the subject of a study in preparation by Dr. R.R. Kowal of the University of Wisconsin, in collaboration with Freeman and Barkley.

The information in this paper rests upon a study of the Aureoid senecios in Mexico, which was presented in a dissertation by Freeman in 1985 (q.v. for distribution maps, descriptions, lists of exsiccatae, and phyletic considerations). Adjustments have been made to account for knowledge accumulated since that time.

The Mexican members of *Packera* are not so well known as the species farther north, and we expect that future field work will add considerably to what is presented here. Doubtless, the known ranges of several of the species will be expanded.

KEY TO *PACKERA* IN MEXICO

1. Herbage glabrous or essentially so at maturity, or with light pubescence in the axils of the leaves and among the heads; basal leaves entire to dentate. The *Aurei* species group.
   2. Heads 1–2(–5); involucres hemispheric; basal and lower cauline leaves often deeply anthocyanic on the abaxial surface. Southern Sierra Madre Occidental. ..... 9. *P. rosei*
   2. Heads more than 5; involucres campanulate; basal and lower cauline leaves infrequently anthocyanic on the abaxial surface.
      3. Blades of lowermost leaves cordate or distinctly truncate at the base. Southern Sierra Madre Occidental. ..... 1. *P. quebradensis*
      3. Blades of lowermost leaves tapering to the petiole.
         4. Blades of lowermost leaves lanceolate to oblanceolate; plants taprooted or with spreading caudex, but without long stolons. Southeastern Coahuila, southeast to Peña Nevada. ..... 2. *P. hintoniorum*

4. Blades of lowermost leaves obovate or oblong-ovate to orbicular; plants usually stoloniferous. Coahuila. ..... *3. P. obovata*

1. Herbage normally pubescent at maturity and/or basal and lower cauline leaves pinnately lobed or pinnate.
5. Basal leaves entire to dentate, or if lobed, then distinctly loose-tomentose. The *Tomentosi* species group.
6. Plants 4.5–8(–10.5) dm tall; basal and lower cauline leaves typically 3–4x longer overall than wide. Baja California. ..... *4. P. moranii*
6. Plants 0.5–5(–10) dm tall; basal and lower cauline leaves (3–)4–12× longer overall than wide.
7. Margins of basal and lower cauline leaves entire or nearly so, at most undulate to obscurely and unevenly dentate.
8. Adaxial surface of basal leaves floccose at flowering time, abaxial surface permanently appressed-tomentose to glabrate. Sierra Volcánica Transveral and Oaxaca uplands. ..... *5. P. bellidifolia*
8. Adaxial and abaxial surfaces of basal leaves permanently densely tomentose to lanate. Northern Sierra Madre Occidental. ... *6. P. candidissima*
7. Margins of basal and lower cauline leaves variously dentate, sometimes irregularly or obscurely so. Sierra Madre Occidental and central Coahuila. ..... *7. P. neomexicana*

5. Basal leaves pinnatifid or pinnate, glabrous to sparsely pubescent, rarely densely pubescent. The *Lobati* species group.
9. Annuals; stems arising from a taproot. Gulf Coast Plain, Río Grande Valley. ..... *8. P. tampicana*
9. Perennials; stems arising from a caudex or spreading rootstock, but young plants may have a taproot.
10. Terminal lobe of basal and lower cauline leaves prominent, distinctly larger than the lateral lobes.
11. Heads 1–2(–5). Southern Sierra Madre Occidental. ..... *9. P. rosei*
11. Heads mostly 4 or more.
12. Abaxial surface of the basal and lower cauline leaves glabrous to floccose-tomentose, but never with short, yellowish-brown, multicellular hairs. Northern Sierra Madre Occidental, Coahuila. ..... *10. P. scalaris*
12. Abaxial surface of the basal and lower cauline leaves with few to many short, yellowish-brown, multicellular hairs, especially on the veins.
13. Ray florets ca. 5 or 8; phyllaries ca. (8–)13; involucres cylindrical. Sierra Volcánica Transversal and Oaxaca uplands. ..... *11. P. sanguisorbae*
13. Ray florets ca. 8 or 13; phyllaries ca. (13–)21; involucres campanulate. Sierra Madre Oriental. ..... *12. P. coahuilensis*

10. Terminal lobe of basal and lower cauline leaves no larger than the lateral lobes.
14. Basal and lower cauline leaves variously pinnatifid; the sinuses between the lobes extending 1/5 to 4/5 the distance to the midrib, thus the midrib is winged.
15. Herbage with coarse, multicellular hairs; basal leaves often runcinate. Northern Sierra Madre Oriental. ..... *13. P. zimapanica*
15. Herbage glabrous to floccose-tomentose; hairs not obvi-

ously multicellular; basal leaves crenate or sublyrate to pinnatifid. Northern Sierra Madre Occidental, Coahuila. ... 10. *P. scalaris*

14. Basal and lower cauline leaves pinnate; the sinuses between the lobes extending to an essentially unwinged midrib.
    16. Cauline leaves absent, or rarely 1–2, the plant appearing scapose; heads 2–4(–5); herbage glabrate or rarely densely tomentose. Nuevo León. ..... 14. *P. montereyana*
    16. Cauline leaves (1–)3–11(–14); heads (1–)3–21(–32); herbage glabrous or sometimes tomentulose when young. Coahuila, Chihuahua. ..... 15. *P. millelobata*

1. **Packera quebradensis** (Greenm.) W.A. Weber & Á. Löve, Phytologia 49:48. 1981. *Senecio quebradensis* Greenm., Ann. Missouri Bot. Gard. 3:117. 1916. TYPE: MEXICO. DURANGO: Quebrada Honda, 20–21 May 1906 (LECTOTYPE, here designated: GH!; photo-MO; ISOLECTOTYPES: F!, MO!, NY!, UC!, US!).

Mesic sites in oak or pine-oak woodlands, in the southern half of the Sierra Madre Occidental; southwestern Chihuahua and northeastern Sinaloa south to Cerro de Tequila in Jalisco; 1000–2800 m. Flowering chiefly in March but year-round in the southern end of the range.

This species is similar to *P. aurea* of the eastern U.S. and adjacent Canada but is shorter, leafier, and with more consistently dentate leaves. Collections from southwestern Durango have leaves with notably obtuse teeth and darkened denticles, plus a distinctive aspect, and may deserve taxonomic recognition.

2. **Packera hintoniorum** (B.L. Turner) C. Jeffrey, Kew Bull. 47:101. 1992. *Senecio hintoniorum* B.L. Turner, Phytologia 67:238. 1989. TYPE: MEXICO. NUEVO LEÓN: Cerro Potosí, rocky treeless summit, 3850 m, 25 Jun 1969, *G.B. Hinton et al. 17048* (HOLOTYPE: TEX!).

Open slopes in oak and pine-oak woodlands, upward to gravelly alpine meadow on Cerro Potosí; northern portion of the High Sierras of Sierra Madre Oriental from southeastern Coahuila, south-southeast to Peña Nevada in southeastern Nuevo León and adjacent southern Tamaulipas; 2000–3700 m. Flowering May through October; lower elevation plants generally begin flowering in May and are in fruit in July, whereas alpine plants flower mostly July through October.

At high elevations, *P. hintoniorum* has a low, subcaespitose aspect, with numerous basal leaves; a stout, weakly spreading caudex; a compact inflorescence with relatively large heads; and persistent tomentum. At lower elevations, the plants tend to be taller and have an erect or suberect caudex that may surmount a taproot; an inflorescence of numerous, smaller heads; and glabrous or glabrate herbage.

This species resembles the more northern *P. tridenticulata*, and differences between the two are summarized by Freeman (1985) and by Barkley

(1988). *Packera hintoniorum* was treated as a portion of *P. scalaris* by Muller (1939) in a discussion of the vegetation of Nuevo León.

3. **Packera obovata** (Mühlenb. ex Willd.) W.A. Weber & Á. Löve, Phytologia 49:47. 1981. *Senecio obovatus* Mühlenb. ex Willd. Sp. Pl. 3:1999. 1804. TYPE: "America boreali" (HOLOTYPE: Willd. Herb. no. 15788, B!).

This species has a rich synonymy, but the types are from temperate North America; see Barkley (1962, 1978) for summary.

Widespread across the eastern half of temperate North America, but known in Mexico from only a few locations around seeps and along streams in oak and oak-pine woodlands, Sierra de la Madera and Sierra del Carmen, Coahuila; 1450–2100 m. Flowering March through May.

4. **Packera moranii** (T.M. Barkley) C. Jeffrey, Kew Bull. 47: 101. 1992. *Senecio moranii* T.M. Barkley, Brittonia 30:69. 1978. TYPE. MEXICO. BAJA CALIFORNIA NORTE: common among granitic boulders on SE slope of Cerro Venado Blanco, San Pedro Mártir, near 31° 05'N, 115° 29'W, ca 2725 m, 15 Sep 1968, *R. Moran 15669* (HOLOTYPE: NY!; ISOTYPES: BM!, CAS!, GH!, KSC!, MEXU!, MO!, SD!, US!).

Seasonally damp sites in rocky igneous and metamorphic soils in open coniferous woodlands or sarcophyllous desert, San Pedro Mártir of central Baja California Norte and Sierra San Francisco of northern Baja California Sur; 1400–2725 m. Flowering August through October. This is the only *Packera* that is known in Baja California.

5. **Packera bellidifolia** (Kunth) W.A. Weber & Á. Löve, Phytologia 49:45. 1981. *Senecio bellidifolius* Kunth, Nov. Gen. & Sp. 4[folio]: 137. 1818; 4[quarto]: 175. 1820. TYPE: MEXICO. SOUTHERN MEXICO: "Crescit in monte ignivomo Jorullo, alt. 580 hex. (Nova Hispania) Floret Septembri," *Humboldt & Bonpland, s.n.* (HOLOTYPE: P; photo: Field Mus. Neg. 37883: F!, MICH!, MO!, US!; tracing and fragments (ISOTYPES?) from B deposited at GH!).

Senecio cheiranthifolius Kunth, Nov. Gen. & Sp. 4[folio]:13. 1818; 4[quarto]:176. 1820. TYPE: MEXICO. SOUTHERN MEXICO: "Crescit locis temperatis juxta Moran et Regla Mexicanorum, alt. 1300 hex., Floret Majo," *Humboldt & Bonpland, s.n.* (HOLOTYPE: P; photo: Field Mus. Neg. 37881, F!, US!; tracing of holotype by J. M. Greenman on 29 Aug 1900 in GH!).

Senecio pauciflorus Kunth, Nov. Gen. & Sp. 4[folio]:138. pl. 365. 1818; 4[quarto]:176. tab. 365. 1820; non *S. pauciflorus* Pursh, 1814. *S. vulneraria* DC., Prodr. 6: 428. 1838. TYPE: MEXICO. VERACRUZ: "Crescit in montibus altissimus Regni Mexicani (Cofre de Perote) juxta Pinahuistepeque, alt. 1500 hex., floret Februario," *Humboldt & Bonpland s.n.* (HOLOTYPE: P; photo: Field Mus. Neg. 37891 F!, MO!, US!).

Senecio lactucella Sessé & Mociño, Fl. Mex. ed. 2. 186. 1894. TYPE: MEXICO. DISTRITO FEDERAL: "Habitat in altoribus et frigidissimus S. Heremi montibus. Floret Julio," 1787–1803, *Sessé & Mociño 3139* (LECTOTYPE: MA (McVaugh 1977); SYNTYPE: F!).

Senecio vulnerarius Sessé & Mociño, Fl. Mex. ed. 2. 186. 1894, non *Senecio vulneraria* (sic) DC. TYPE: MEXICO. DISTRITO FEDERAL: "Habitat in Heremo P.P. Carmelitarum," 1787–1803 *Sessé & Mociño 3147* (LECTOTYPE: MA [McVaugh 1977]; SYNTYPE: F!).

Frequent in pine and pine-fir forests and in open, high meadows in the Sierra Volcánica Transversal; less frequent in the Oaxaca uplands, the Sierra Madre del Sur, and the Sierra Madre Oriental in Coahuila and Nuevo León; 2740–4420 m. Flowering almost year-round, but most of the flowering specimens were collected March through August.

This species is similar in aspect to *P. cana* of western temperate North America (Barkley 1988 for key) and to *P. candidissima* of Mexico (q.v.).

It is evident in the synonymy that the epithet "vulneraria" was used twice; once as *Senecio vulneraria* (sic) by DeCandolle to replace the pre-occupied *S. pauciflorus* of Kunth, and again (as *Senecio vulnerarius*) by Sessé & Mociño. Despite being homonyms, the two names ride on different type collections.

6. **Packera candidissima** (Greene) W.A. Weber & Á. Löve, Phytologia 49:46. 1981. *Senecio candidissimus* Greene, Pittonia 4:110. 1900. TYPE: MEXICO. CHIHUAHUA: near Colonia García in the Sierra Madres, alt. 2285 m, 24 May 1899, *C.H.T. Townsend & C.M. Barber 1* (LECTOTYPE, here designated: ND-G!; ISOLECTOTYPES: F!, GH!, MEXU!, MO!, MSC!, NMC!, NY!, US!).

Open sites, often on thin soils of igneous origin, in pine oak or pine-fir forests; northern half of the Sierra Madre Occidental from northwestern Chihuahua (Colonia Juárez) south to southwestern Chihuahua on Cerro Mohinora; 2070–3200 m. Flowering April through June.

The type locality, Colonia García, was a small Mormon settlement in the Sierra Madre Occidental, about 55 miles southeast of Casas Grande in northwestern Chihuahua (Goldman 1951). The type collection for *P. scalaris* (q.v.) was also from this area.

This species is somewhat weedy and forms spreading colonies from branching caudices. Ethnobotanical studies show that it has been used medicinally by the Indians of Chihuahua. Herbarium labels and correspondence with Dr. Robert A. Bye indicate that he is actively studying these medicinal uses.

7. **Packera neomexicana** (A. Gray) W.A. Weber & Á. Löve, Phytologia 49:47. 1981. *Senecio neomexicanus* A. Gray, 9:55. 1883, *nomen nudum*. Syn. Fl. N. Amer. 1(2):392. 1884. TYPE: UNITED STATES. ARIZONA. Pima Co: Santa Catalina Mts, Apr 1880, *J.G. Lemmon 49* (LECTOTYPE: GH!). Typification of this name follows Turner (1993) and replaces an earlier notion by Barkley (1978).

Senecio hartmanii Greenm., Monographie der nord- und centralamerikanischen Arten der Gattung *Senecio*. I. Teil. 24. 1901, *nomen nudum*. Engl. Bot. Jahrb. 32:20. 1902. *nomen nudum*. Ann. Missouri Bot. Gard. 5:44. 1918 TYPE: MEXICO. CHIHUAHUA: Puerta de St. Diego, alt. 1980 m, 12 Apr 1891, *C.V. Hartman 623* (LECTOTYPE, here designated: GH!; ISOLECTOTYPE: US!; photo: KSC!).

This species has a complicated taxonomy and synonymy; see Barkley (1978, 1980) for summary.

Widespread and frequent in southwestern U.S. but represented in Mexico by rather few collections; rocky soils, mostly in oak scrub and open oak-pine woodlands, scattered in central Coahuila, the northern Sierra Madre Occidental, and northeastern Sonora; 1650–4210 m. Flowering March through August.

Three varieties are more or less discernable in the U.S. (Barkley 1978, 1980), and a case can be made for recognizing more than one species within the complex (Turner 1993). The Mexican plants are regarded here as belonging to the widespread and variable var. *neomexicana*.

8. **Packera tampicana** (DC.) C. Jeffrey, Kew Bull. 47:101. 1992. *Senecio tampicanus* DC., Prodr. 6:427. 1838. TYPE: MEXICO. TAMAULIPAS: Tampico de Tamaulipas, 1827, *J. Berlandier 186* (LECTOTYPE, here designated: G-DC, Prod. Herb. microfiche, 800. 1141: I, 1; ISOLECTOTYPE: F!; photo: Field Mus. Neg. 33823: F!, MICH!, MO!. Tracing and fragments apparently taken by J. M. Greenman at B are deposited at GH!).

Senecio imparipinnatus Klatt, Abh. Naturf. Ges. Halle 15:333. 1882. TYPE: UNITED STATES. TEXAS: "Bejar a la villa de Austin," Apr 1828, *J. Berlandier 1741* (LECTOTYPE: GH! [Barkley 1978]).

Senecio greggii Rydb. Bull. Torrey Bot. Club 27:170. 1900. TYPE: MEXICO. CHIHUAHUA. valley of Río Parral, near Santa Rosalía (= Ciudad Camargo, according to Goldman 1951), 21 Apr 1847, *Dr. Gregg 11* (HOLOTYPE: NY!; ISOTYPES: GH!, MO!).

Senecio ervendbergii Greenm., Monographie der nord-und centralamerikanischen Arten der Gattung *Senecio*, I. Teil. 24. 1901, *nomen nudum*. Engl. Bot. Jahrb. 32:19. 1902, *nomen nudum*. Publ. Field Columbian Mus., Bot. Ser. 2:275. 1907. TYPE: MEXICO. VERACRUZ: near Tantoyuca, province of Huasteca, Oct 1858, *C.L. Ervendberg 90* (HOLOTYPE: GH!).

Monocarpic weed in open, disturbed sites, especially along the Coastal Plain in Tamaulipas, Nuevo León, and northern Veracruz, and less frequently in the Basin and Ranges of Chihuahua; 0–1400 m. Flowering mostly February through April. It also occurs northward into the central U.S., as far as Kansas.

9. **Packera rosei** (Greenm.) W.A. Weber & Á. Löve, Phytologia 49:48. 1981. Monographie der nord- und centralamerikanischen Arten der Gattung *Senecio*, I. Teil. 24. 1901, *nomen nudum*. Engl. Bot. Jahrb. 32:20. 1902, *nomen nudum*. Publ. Field Columbian Mus., Bot. Ser. 2:276., Pl. 3, fig. 1. 1907. TYPE: MEXICO. NAYARIT: Territory of Tepic, in the Sierra Madre, near Santa Teresa, 10 Aug 1897, *J.N. Rose 2157* (LECTOTYPE: GH! [McVaugh 1984]; ISOLECTOTYPE: US!).

Marshy ground or mesic sites in pine forest regions, southern Sierra Madre Occidental from southwestern Durango (La Ciudad) south to Santa Teresa in northwestern Nayarit; 2130–2740 m. Flowering mostly in August and September. *Packera rosei* is a facultative aquatic and can grow in saturated ground or shallow puddles, at least for a short time. This species belongs to the *Lobati* species group but it is also keyed among the *Aurei* for convenience.

10. **Packera scalaris** (Greene) C. Jeffrey

Three varieties are recognized here and are distinguished as follows:

1. Basal and lowermost cauline leaves abaxially glabrous or essentially so.
   2. Inflorescence a compact, subumbellate or corymbiform cyme; cypselas glabrous; lower stem and basal leaves seldom anthocyanic. Northern Sierra Madre Occidental. ..... 10a. *P. scalaris* var. *scalaris*
   2. Inflorescence a loose corymbiform cyme; cypselas hirtellous on the angles; lower stem and basal leaves frequently anthocyanic. Southwestern Coahuila. ..... 10b. *P. scalaris* var. *parrasiana*
1. Basal and lowermost cauline leaves abaxially lightly tomentose or floccose-tomentose. Northern Coahuila. ..... 10c. *P. scalaris* var. *carmenensis*

10a. Packera scalaris (Greene) C. Jeffrey var. **scalaris** Kew Bull. 47:101. 1992. *Senecio scalaris* Greene, Pittonia 4:108. 1900. TYPE: MEXICO. CHIHUAHUA: near Colonia García in the Sierra Madres, alt. 7600 ft, 13 Jul 1899, *C.H.T. Townsend & C.M. Barber 131* (LECTOTYPE, here designated: US!; ISOLECTOTYPES: F!, GH!, KSC!, MO!, MSC!, NMC!, NY!, TEX!, US!).

Gravelly to sandy soils in open pine forests and in cleared pastures, in the northern Sierra Madre Occidental from northwestern Chihuahua south to northwestern Durango; 1525–3140 m. Flowering mostly June through August but infrequently into October.

10b. Packera scalaris var. **parrasiana** (Greenm.) C.C. Freeman & T.M. Barkley, comb. nov. *Senecio parrasianus* Greenm., Ann. Missouri Bot. Gard. 4: 20. 1917. *S. scalaris* var. *parrasianus* (Greenm.) C.C. Freeman, Phytologia 67:238. 1989. TYPE: MEXICO. COAHUILA: Sierra de Parras, Jul 1910, *C.A. Purpus 4575* (LECTOTYPE, here designated: US!; ISOLECTOTYPES: F!, MO!).

Gravelly, calcareous sites in open pine-oak-juniper woodlands and scrub in the Sierra de Parras of southwestern Coahuila; 1500–2880 m. Flowering mostly May through July.

10c. Packera scalaris var. **carmenensis** (C.C. Freeman) C.C. Freeman & T.M. Barkley, comb. nov. *Senecio scalaris* var. *carmenensis* C.C. Freeman, Phytologia 67:249. 1989. TYPE: MEXICO. COAHUILA: Mpio. Villa Acuña, Sierra del Carmen, Canon de Sentenela (= Cañon del Centinel) on Hacienda Piedra Blanca; moist stream side, 6 Jul 1936, *F.L. Wynd & C.H. Mueller 546* (HOLOTYPE: NY!; ISOTYPES: GH!, MICH!, MO!, TEX!).

Gravelly loam that apparently is derived from rhyolite, in open pine-oak woodlands in the Sierra del Carmen of northwestern Coahuila; 1500–2590 m. Flowering May through September.

11. **Packera sanguisorbae** (DC.) C. Jeffrey, Kew Bull. 47:101. 1992. *Senecio sanguisorbae* DC. Prodr. 6:427. 1838. TYPE: MEXICO. MÉXICO: "circa Toluccanum [Toluca], Floret Aprili," 1834, *G. Andrieux 292* (LECTOTYPE: G-DC [McVaugh, 1984], Prod. Herb. IDC Microfiche 800. 1141: I, 3; photo: Field Mus. Neg. 38811, F!, MICH!, MO!).

Cineraria pinnata La Llave in La Llave & Lexarza, Nov. Veg. Descr. 1:29. 1824, non *Senecio pinnatus* Poiret. *Senecio pinnatisectus* DC., Prodr. 6:427. 1838. TYPE: MEXICO. VERACRUZ: "crescit ab umbram in petrosis, amque martio florentem inveni, in declivitate quae ducit ad ultimum cataractam fluminis Blanco," *P. La Llave* (HOLOTYPE: G).

Along streams and on mesic sites in pine, pine-oak, and pine-fir forests throughout the Sierra Volcánica Transversal, the southern end of the Sierra Madre Oriental, and the Oaxaca Uplands of the Sierra Madre del Sur; 1465–3355 m. Flowering mostly May through November but also throughout the year.

12. **Packera coahuilensis** (Greenm.) C. Jeffrey, Kew Bull. 47:101. 1992.

Senecio coahuilensis Greenm., Monographie der nord- und centralamerikanischen Arten der Gattung *Senecio*, I. Teil 23. 1901, *nomen nudum*. Engl. Bot. Jahrb. 32:19. 1902, *nomen nudum*. Publ. Field Columbian Mus., Bot. Ser. 2:275. pl. 19, fig. 2. 1907. TYPE: MEXICO. COAHUILA: Lerios (= Lirios?), Feb-Oct 1880, *E. Palmer 755* (LECTOTYPE, here designated: GH!, ISOLECTOTYPES: K, NY!, US!; photo: MO!. The NY specimen has the following: "mt section 15 leagues E of Saltillo, about 10000 ft, Jul 10-13, 1880").

Senecio leonensis Greenm., Monographe der nord- und centralamerikanischen Arten der Gattung *Senecio*. I. Teil 23. 1901, *nomen nudum*. Engl. Bot. Jahrb. 32:19. 1902 *nomen nudum*. Publ. Field Columbian Mus., Bot. Ser. 2:276. pl. 19, fig. 1. 1907. TYPE: MEXICO. NUEVO LEÓN: Sierra Madre, near Monterrey, 1 Jun 1899, *C.G. Pringle 2894* (HOLOTYPE: GH!; photo: MO!).

Senecio cyclophyllus Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:276. 1907. TYPE: MEXICO. NUEVO LEÓN: Sierra Madre above Monterrey, 2500–3000 ft, 31 Mar 1906, *C.G. Pringle 10230* (HOLOTYPE: GH!; ISOTYPES: F!, GH!, KANU!, LL!, MICH!, MSC!, NMC!, SD!, US!, WIS!; photo: F!, MO!).

Senecio hypotrichus Greenm., Ann. Missouri Bot. Gard. 2:612. 1915. TYPE: MEXICO. SAN LUIS POTOSÍ: chiefly in the region of San Luis Potosí, 6000–8000 ft, 1878, *C.C. Parry & E. Palmer 533* (HOLOTYPE: US!; photo with fragments, MO!). Greenman (1915) noted that *Parry & Palmer 533* is a mixed collection, and that the species was described from the specimen at US. The specimens of that number at F, GH, and NY are included here within *P. tampicana*.

Along streams and in open mesic to mildly xeric sites in pine-oak, pine, and pine-fir woodlands and occasionally in alpine meadows, throughout the Sierra Madre Oriental but most frequent in the High Sierras of west-central Nuevo León and southeastern Coahuila and the northern sierras of Coahuila; 1345–3720 m. Flowering mostly April through August, but also at other times.

The name *Senecio cyclophyllus* has been used for plants on which the terminal lobe of the basal and lower cauline leaves is much enlarged and the lateral lobes are relatively reduced. Examination of a series of specimens suggests that this morphotype is merely a part of a large cline and it is accomodated comfortably within *P. coahuilensis*.

13. **Packera zimapanica** (Hemsley) C.C. Freeman & T.M. Barkley, comb. nov. *Senecio zimapanicus* Hemsley, Biol. Centr. Amer. Bot. 2:248. 1881. TYPE: MEXICO. HIDALGO: Zimapán, *J.M. Coulter 423* (Putative HOLOTYPE: K [Greenman 1915]).

Gravelly soils and stream banks in pine woodlands in the Sierra Madre Oriental from Cerro Potosí in southeastern Nuevo León, southward to northern Hidalgo; 2740–3430 m. Flowering July and August. A highly distinctive and poorly known species.

14. **Packera montereyana** (S. Watson) C. Jeffrey, Kew Bull. 47:101. 1992. *Senecio montereyanus* S. Watson, Proc. Amer. Acad. Arts 25:255. 1890. TYPE: MEXICO. NUEVO LEÓN: dry shaded ledges on the Sierra Madre, near Monterrey, 27 Jun 1888, *C.G. Pringle 1922* (LECTOTYPE, here designated: GH!; ISOLECTOTYPES: COLO!, F!, K, MICH!, MO!, NY!, UC!, US!).

Known only from limestone ledges in pine forests in the Sierra Madre above Monterrey, Nuevo León; 1370–1525 m. Flowering April through September and rarely at other times.

15. **Packera millelobata** (Rydberg) W.A. Weber & Á. Löve, Phytologia 49: 47. 1981. *Senecio millelobatus* Rydb. Bull. Torrey Bot. Club 27:171. pl. 5. 1900. TYPE: UNITED STATES: TEXAS: hills on the Limpia, 1851-1852, *C. Wright 1287* (HOLOTYPE: NY!; ISOTYPES: GH!, MO!, NY!, PH!, US!; photo: KSC!).

Mesic open sites in oak woodlands of northern Coahuila and central Chihuahua and north of the Rio Grande in adjacent Trans-Pecos Texas; 1066–2130 m. Flowering mostly March through September, but also at other times.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance of the staff of the Herbario Nacional (MEXU), Instituto de Biologia, Universidad Nacional Auto'noma de México for making the facilities of that institution available and for collegial kindness. Particular thanks are due to Dr. José Luis Villaseñor (MEXU) for his interest in the work and for sharing his considerable knowledge. This paper is Contribution no. *95-549-J* from the Kansas Agricultural Experiment Station, Manhattan.

REFERENCES

BARKLEY, T.M. 1962. A revision of *Senecio aureus* Linn. and allied species. Trans. Kansas Acad. Sci. 65:318–408.

_____. 1978. *Senecio. In*: N. Amer. Fl. II. 10:50–39.

_____. 1980. Taxonomic notes on *Senecio tomentosus* and its allies (Asteraceae). Brittonia 32:291–308.

_____. 1985a. Generic boundaries in the Senecioneae. Taxon 34:17–21.

_____. 1985b. Infrageneric groups in *Senecio*, s.l., and *Cacalia*, s.l., (Asteraceae:Senecioneae) in Mexico and Central America. Brittonia 37:211–218.

_____. 1988. Variation among the aureoid senecios of North America: a geohistorical interpretation. Bot. Rev. 54:82–106.

BARKLEY, T.M., B.L. CLARK, and A.M. FUNSTON (In press). The segregate genera of *Senecio*, s.l., and *Cacalia*, s.l., (Asteraceae: Senecioneae) in Mexico and Central America. In: D. J.N. Hind, et al., eds. Proceedings of the International Compositae Conference, Kew, 1994. Royal Botanic Gardens, Kew.

BREMER, K. 1994. Asteraceae; cladistics & classification. Timber Press, Portland.

FREEMAN, C.C. 1985. A revision of the aureoid species of *Senecio* (Asteraceae:Senecioneae) in Mexico, with a cytogeographic and phylogenetic interpretation of the aureoid complex. Doctoral dissertation, Kansas State University, Manhattan.

GOLDMAN, E.A. 1951. Biological investigations in Mexico. Smithsonian Misc. Coll. 115: 1–476.

GREENMAN, J.M. 1915. Monograph of the North and Central American species of the genus *Senecio* - Part II. Ann. Missouri Bot. Gard. 2:573–626.

JEFFREY, C. 1992. The tribe Senecioneae (Compositae) in the Mascarene Islands with an annotated world check-list of the genera of the tribe: notes on Compositae VI. Kew Bull. 47:49-109.

MCVAUGH, R.J. 1977. Botanical results of the Sessé & Mociño expedition (1787-1803) I. Summary of excursions and travels. Contr. Univ. Michigan Herb. 11:97–195.

_____. 1984. Flora Novo-Galiciana. vol. 12, Compositae. Univ. Michigan Press, Ann Arbor.

MULLER, C.H. 1939. Relations of the vegetation and climatic types of Nuevo León, Mexico. Amer. Midl. Naturalist 21:687–729.

TURNER, B.L. 1993. Lectotypification of *Senecio neomexicanus* A. Gray. Phytologia 75: 221–223.